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NEW HUNGARIAN MINIATURE RADIO TUBES

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In the Hungarian People's Republic, the "Tungsram" firm has developed and is producing new types of miniature receiving tubes, including a series of tubes with economical cathodes designed for battery supply. This series includes the following tubes: the 1T4T remote-cutoff rf pentode, the 1R5T heptode frequency converter, the 1S5T diode-pentode which can be used for detection and amplification of audio frequencies, and the 1S4T and 3S4T pentodes for power amplification.

These tubes, except for the 3S4T, have a filament voltage of 1.4 v. The 3S4T tube has a tap from the midpoint of the filament so that the two halves can be connected either in parallel or in series. If they are connected in series, a voltage of 2.8 v is applied to the filament; if connected in parallel, the corresponding figure is 1.4 v.

The tubes are 48 mm in height and have an envelope diameter of 19 mm. Seven pins are mounted in a flat glass bottom; these are spaced 45° apart, except for pins 1 and 7 which are 90° apart, around a circle having a diameter of 9.5 mm.

The cathodes of the tubes are made from tungsten wire 0.012 mm in diameter and have an oxide coating. The working temperature of the cathodes is about 700° C. To reduce microphone effect, the cathode of the 1T4T tube is equipped with a shock cushion in the form of a ceramic support attached inside the control grid.

Typical operating conditions and parameters of the Hungarian miniature tubes are given in the appended table and the tube base diagrams are shown in the appended figure.

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The table shows that the Hungarian tubes are very similar to Soviet-produced battery tubes in basic electrical parameters. The 1R5T is an analog of the 1A1P heptode, the 1T4T can replace the 1K1P pentode, and the 1S5T can replace the 1B1P diode-pentode. Although the operating conditions recommended for the Hungarian tubes are slightly different from those recommended for Soviet tubes, they can be used instead of the 1A1P, 1B1P, and 1K1P tubes, which operate at a filament voltage of 1.2 v. This causes only a slight reduction in their electrical parameters.

Since the filament resistances of these tubes is greater than in Soviet tubes, self-excitation through the filament circuit may arise if they are used in the "Rodina-2" receiver. To eliminate this effect, a fixed capacitor with a capacitance of several thousand micro-microfarads should be connected between the filament pins of the mixer tube. The effect can also be eliminated by connecting an rf choke in the filament circuit in series between the mixer tube and the first i-f stage. This choke should have 45-50 turns of PELShO 0.25 wire in a "Universal" winding with a winding thickness of 6.5 mm. In this way, self-excitation through the filament circuit can be completely eliminated in the "Rodina-52" receiver and also in receivers having more tubes than the "Rodina-52."

/Appended table and figure follow./

BASIC DATA ON HUNGARIAN RADIO TUBES

	1T4T RF Pentode		1R5T Heptode		1S5T Diode-Pentode			Output Pentodes					
								1S4T	3S4T				
Filament voltage, V	1.4		1.4		1.4			1.4	2.8		1.4		
Filament current, mA	25		25		25			50	25		50		
Plate voltage, V	45	90	45	90	45	67.5	90	45	90	45	90	45	90
Plate current, mA	1.7	3.5	0.57	1.37	--	--	--	3.8	7.4	3.2	6.0	3.8	7.4
Screen-grid voltage, V	45	67.5	45	67.5	45	67.5	90	45	67.5	45	67.5	45	67.5
Screen-grid current, mA	0.7	1.4	1.8	3.2	--	--	--	0.8	1.4	0.6	1.2	0.8	1.4
Control grid voltage, V	0...-10	0...-16	0...-9	0...-14	0	0	0	-4.5	-7.0	-4.5	-7.0	-4.5	-7.0
Load resistance (at kilohms	--	--	--	--	1000	1000	1000	8	8	8	8	8	8
Output power, mW	--	--	--	--	--	--	--	55	240	50	220	65	240
Amplification factor	230	400	--	--	300	300	300	120	140	105	130	125	140
Transconductance, ma/v	0.65...0.10	0.8...0.08	0.23...0.005	0.3...0.009	0.5	0.5	0.5	1.2	1.4	1.05	1.3	1.25	1.4
Internal resistance, kilohms	350	500	600	600	600	600	600	100	100	100	100	100	100
Plate-control grid capacitance, μμfd	0.01		0.4		0.2			--	--		--		

NOTES: 1. ANODE AND SCREEN-GRID CURRENTS, AND [illegible] AMPLIFICATION FACTOR AND INTERNAL RESISTANCE, FOR THE 1T4T AND 1R5T REMOTE-CUTOFF TUBES ARE GIVEN FOR ZERO CONTROL-GRID VOLTAGE.

2. THE CONVERSION TRANSCONDUCTANCE IS GIVEN FOR THE 1R5T HEPTODE; A RESISTANCE OF 100 KILOHMS IS CONNECTED IN THE OSCILLATOR GRID CIRCUIT.

3. THE MAXIMUM PLATE VOLTAGE FOR THE DIODE OF THE 1S5T TUBE IS 90 V; THE MAXIMUM DIODE CURRENT IS 0.2 MA. A 3-MEGOHM RESISTANCE IS CONNECTED INTO THE SCREEN-GRID CIRCUIT OF THE 1S5T TUBE.

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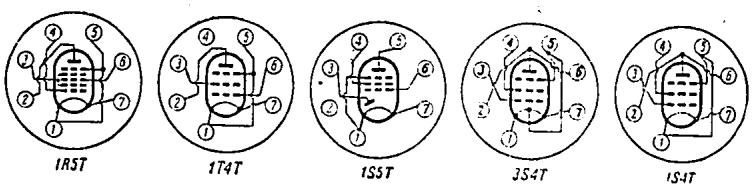

Tube Base Diagrams for Hungarian Miniature Radio Tubes

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